

## Appendix B – Background to Age Limit & Emissions Policy For Hackney Carriages & Private Hire Vehicles

### Legal and Regulatory Background

Part IV of the Environment Act 1995 provides the framework for Local Air Quality Management (LAQM) whereby all local authorities are required to annually review and assess the air quality within their boundaries. Where the review shows that National Air Quality Objectives (NAQO) are not being met, the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) to demonstrate how the local authority intends to work towards meeting the objectives.

UK National Objective concentration to be achieved by 2005 for annual Mean NO <sub>2</sub> - 40 µg/m <sup>3</sup>
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EU Limit value (legally binding) to be achieved by December 2015 for annual Mean NO <sub>2</sub> – 40 µg/m <sup>3</sup>
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There is also a duty to reduce concentrations of very small particulate matter, PM <sub>2.5</sub> , by 15% between 2010 and 2020.
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Cambridge City Council declared an Air Quality Management Area in 2004, based on predicted exceedences of the NAQO for nitrogen dioxide, NO<sub>2</sub>.

### Pollutants of concern in Cambridge

#### *Nitrogen dioxide*

Nitric oxide (NO) and Nitrogen Dioxide (NO<sub>2</sub>) are both emitted from vehicles as a product of combustion; together they are known as Nitrous Oxides or NO<sub>x</sub>. After Nitric Oxide is emitted from a vehicle it oxidises in the air to Nitrogen Dioxide. Emissions from vehicles are measured as NO<sub>x</sub>.

Nitrogen Dioxide can irritate the lungs and lower resistance to respiratory infections. Exposure to very high concentrations may cause increased respiratory illness in children.

### *Particulate matter*

Fine particles (PM) are emitted from vehicles exhaust as a product of combustion, as well as brake and tyre wear. PM<sub>10</sub> and the smaller PM<sub>2.5</sub> can be carried deep into the lungs. They may also carry carcinogenic compounds into the lungs. There is no safe limit for exposure to particulate matter, which is why the exposure reduction targets were introduced in 2010.

### Methodology for calculations

1. Details of the full fleet licensed by Cambridge City Council were extracted from the database.
2. The total annual emissions of a randomly selected but representative 20% of the fleet were calculated using the 2009 emission factors published by the DfT. For example, if there were 100 diesel Euro 4 Hackney cabs, then 20 of these were selected at random for the calculations.
3. The total annual emissions of 20% of the current fleet were calculated, by multiplying the pollutant grams per kilometre by the annual distance. Whilst some of the distance will not be in the Core Area, and possibly not within Cambridge, there is an assumption that the relative percentage is constant. Remember, that this exercise is to examine the impact of policy changes on relative emissions, not to calculate emissions in a particular area.
4. Emissions from Euro 3 vehicles were replaced with emissions from Euro 4 vehicles to assess the impact of removing all Euro 3 taxis from the fleet. This is a worst-case scenario; it could be that some Euro 5 vehicles would replace Euro 3 taxis. There is an assumption that the mileage is the same. The impact of this would be to reduce emissions of particulate matter and nitrous oxides by 14%.
5. Emissions from Euro 3 and Euro 4 vehicles were replaced with emissions from Euro 5 vehicles to assess the impact of removing all Euro 3 and 4 taxis from the fleet.

Table One - Emission Factors

<b>Emission factors taken from TRL / DEFRA 2009 published data</b>				<b>NOx at 24kmh (15mph) Average g/km</b>			
<b>Euro Category</b>			<b>Emission Code</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Vehicle Type</b>							
Car <2.5 t	Petrol	1400-2000 cc	2	0.081546	0.057593	0.034196	0.034196
Car <2.5 t	Diesel	1400-2000 cc	5	0.592193	0.378594	0.255551	0.113578
Car <2.5 t	Diesel	>2000 cc	6	0.803358	0.401679	0.271133	0.120504
Car <2.5 t	LPG	All	7	0.392935	0.209565	0.157174	0.157174
Car 2.5-3.5 t	Petrol	All	8	0.145042	0.084124	0.049949	0.049949
Car 2.5-3.5 t	Diesel	All	9	0.804092	0.402046	0.271381	0.120614
Car (taxi)	Diesel	All	10	0.826430	0.413215	0.278125	0.124163

<b>Emission factors taken from TRL / DEFRA 2009 published data</b>				<b>PM at 24kmh (15mph) Average g/km</b>			
<b>Euro Category</b>			<b>Emission Code</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>Vehicle Type</b>							
Car <2.5 t	Petrol	1400-2000 cc	2	0.001438	0.001438	0.001438	0.001438
Car <2.5 t	Diesel	1400-2000 cc	5	0.042796	0.030490	0.000500	0.000500
Car <2.5 t	Diesel	>2000 cc	6	0.033111	0.010283	0.000500	0.000500
Car <2.5 t	LPG	All	7	0.001438	0.001438	0.001438	0.001438
Car 2.5-3.5 t	Petrol	All	8	0.001309	0.001298	0.001298	0.001298
Car 2.5-3.5 t	Diesel	All	9	0.033111	0.010283	0.000500	0.000500
Car (taxi)	Diesel	All	10	0.076548	0.045929	0.000500	0.000500

Figure One - Emission standards for diesel cars

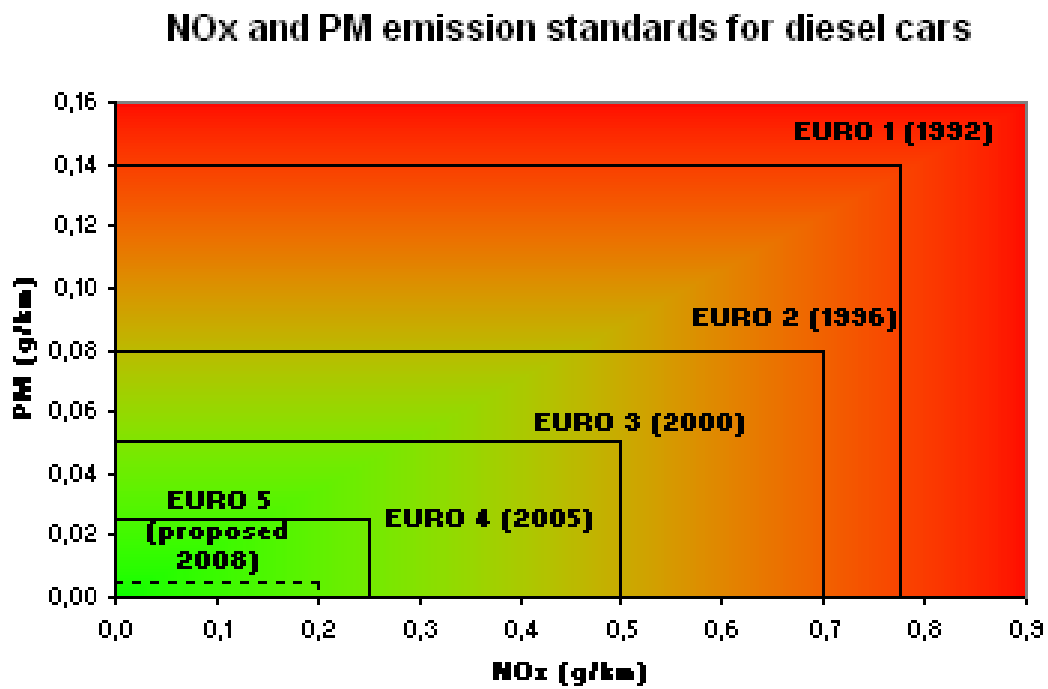


Table Two - Euro Standard Introduction Dates

Euro Standard Introduction Dates	
Euro 4	January 2005
Euro 5	September 2009
Euro 6 (future)	September 2014